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PATENT APPLICATION

OCT 25 2004
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of

Docket No: Q61020

Tatsuki KOUWA, et al.

Appln. No.: 09/688,350

Group Art Unit: 2834

Confirmation No.: 9796

Examiner: J. Gonzalez

Filed: October 16, 2000

For: VOLTAGE CONTROL APPARATUS FOR VEHICLE GENERATOR

SUBMISSION OF APPEAL BRIEF

MAIL STOP APPEAL BRIEF - PATENTS

Commissioner for Patents

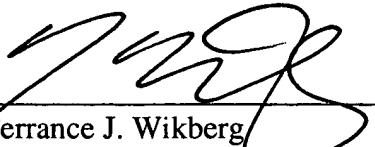
P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

Submitted herewith please find an Appeal Brief. A check for the statutory fee of \$340.00 is attached. The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account. A duplicate copy of this paper is attached.

Respectfully submitted,


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Date: October 25, 2004



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APPEAL BRIEF UNDER 37 C.F.R. § 41.37

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Sir:

In accordance with the provisions of 37 C.F.R. § 41.37, Appellant submits the following:

I. REAL PARTY IN INTEREST

The real party in interest is MITSUBISHI DENKI KABUSHIKI KAISHA of Tokyo, Japan, the assignee of the present application. The assignment was recorded on October 16, 2000 at Reel 011251, Frame 0100.

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II. RELATED APPEALS AND INTERFERENCES

Appellant, Appellant's legal representatives, and the assignee in this application are not aware of any other pending appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in the instant appeal.

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III. STATUS OF CLAIMS

Claims 1 through 8 are all of the claims pending in the present application, and currently claims 1-2, 4 and 6-8 stand rejected. Claims 3 and 5 have been objected to, but have been indicated as allowable, if these claims were written in independent form.

This is an appeal from the Examiner's Final Office Action, dated April 27, 2004 rejecting claims 1, 2, 4, and 6-8. All of the claims pending in the present application are set forth in their entirety in Appendix A, attached to this Brief on Appeal.

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IV. STATUS OF AMENDMENTS

There are no outstanding, non-entered amendments of the claims.

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V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The present invention is directed to a voltage control apparatus for a vehicle generator wherein an ignition switch and a charge lamp are connected in series, with each other, so that a single input terminal is commonly used for both the lamp and the ignition switch.

In conventional voltage control systems for vehicle generators, as shown in Figure 7 of the present application, there is a light emitting element which is used as the charge lamp. In the conventional configurations, a current limiting resistor is mounted in series with the light emitting element on a vehicle side in order to prevent the transistor used for turning on the light emitting element from being damaged by an overcurrent. This configuration is shown in Figure 7, of the present application, where the transistor 152 is used turn on the light emitting element. Although this configuration protects the transistor 152 from overcurrent damage, it is not without its disadvantages. Namely, this configuration is relatively complicated. Further, when a high voltage, such as the battery voltage, is directly applied to the input terminal, the transistor 152 may still be damaged or broken by an overcurrent.

The present invention is directed to addressing the above problems, and a concise description of the claimed subject matter of the present invention is set forth below, with regard to each of the respective independent claims. Each of the following discussions will include reference to various portions of the present application to aid in the understanding of the discussion. However, such reference, unless otherwise indicated, is intended to point out the

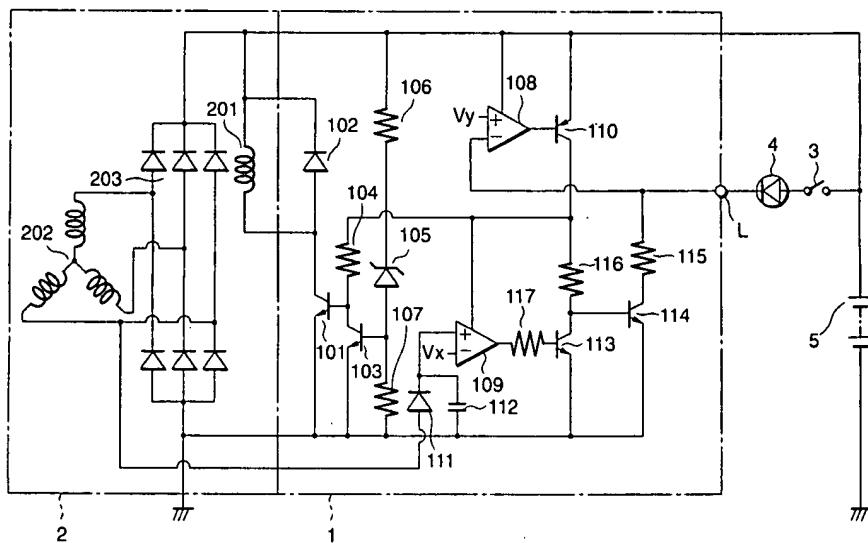
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described exemplary embodiments, and it is not intended to limit the scope of the claims to only the express embodiments cited below.

Claim 1:

The claimed subject matter, as set forth in claim 1, is a voltage control apparatus 1 for a vehicle. *See Figures 1-2.* To aid in the following discussion, Figure 1 has been reproduced below.

FIG. 1



As shown by the non-limiting embodiment shown in Figure 1, the voltage control apparatus 1 has an input terminal L for inputting the voltage of the battery 5 through an ignition switch 3 and a light emitting element 4. The light emitting element 4 is driven by low dissipation power and is connected in series with the switch 3. See Specification, page 8, lines 20-25. When the voltage at the input terminal L exceeds a predetermined value the rotor coil 201 of the vehicle generator 2 is excited. Further, a current limiting resistor 115 is connected in

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series with a transistor 114 between the input terminal L and the collector of the transistor 114.

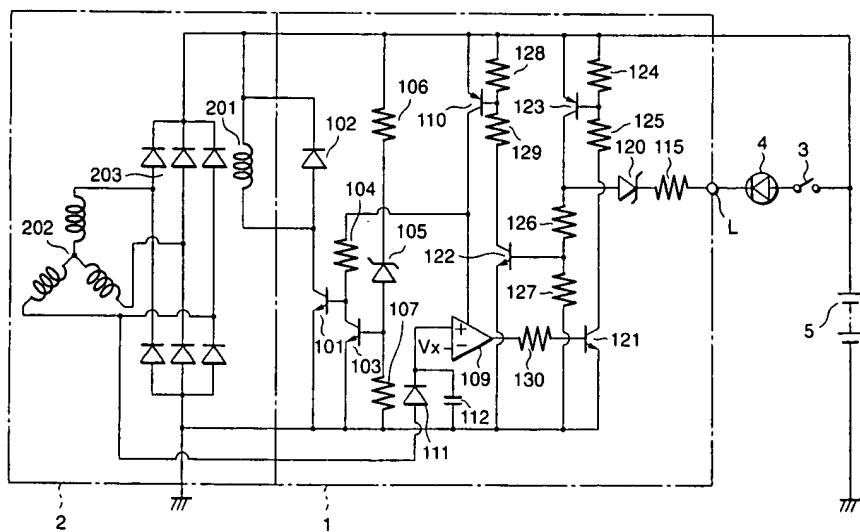
The transistor 114 is used for lighting or driving the light emitting element 4. *See id.* at page 9, lines 1-11.

As shown in Figure 1, the current limiting resistor 115 is disposed between the lighting transistor 114 (used for lighting the element 4) and the input terminal L, and no other transistor is disposed between the lighting transistor 114 and the light emitting element 4. *See Figure 1.* With this configuration, the above problems associated with the prior art are avoided while still providing sufficient protection from overcurrent.

Claim 2:

The claimed subject matter, as set forth in claim 2, is also a voltage control apparatus 1 for a vehicle. *See Figure 3.* To aid in the following discussion, Figure 3 has been reproduced below.

FIG.3



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Although similar to the non-limiting embodiment set forth in Figure 1, the apparatus 1 shown in Figure 3 is slightly different. Specifically, the apparatus 1 also contains an input terminal L for inputting a voltage of a battery 5 through an ignition switch 3 and a light emitting element 4, which is connected in series with the switch 3. Further, the rotor coil 201 of the vehicle generator 2 is started in excitation when a voltage at the input terminal L exceeds a predetermined value. However, in this claimed embodiment, the light emitting element 4 is lighted by a current which is inputted into the input terminal L for starting an operation of the voltage control apparatus 1. Thus, the light emitting element 4 is lighted by the same current which is inputted into the input terminal L for starting the operation of the voltage control apparatus 1. This configuration eliminates the need for a dedicated element used for lighting the light emitting element 4. *See Specification, page 12, lines 1-22.*

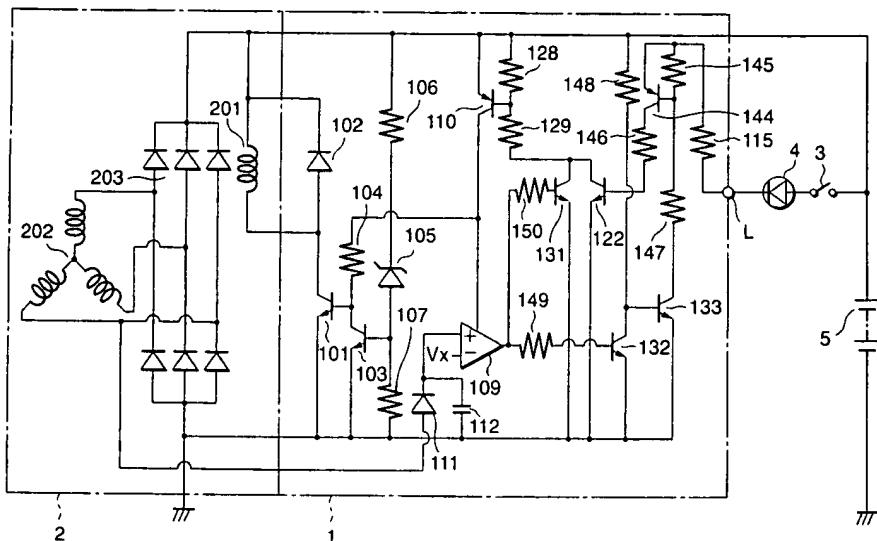
In this configuration, when the switch 3 is closed a transistor 122 is supplied with a base current through the element 4, the resistor 115, the zener diode 120 and a resistor 126, so that the transistors 122 and 110 are turned “on.” Therefore, the transistor 101 is supplied with a base current through the resistor 104, and is thus turned “on” and the rotor coil 201 is supplied with a field current. *See id. at lines 15-21.* Additionally, the element 4 is then lighted by the base current of the transistor 122, which is supplied to the input terminal L through the ignition switch 3 for driving the transistor 122. In this configuration, the dedicated transistor used for turning on-off the element 4 can be eliminated, thus simplifying the circuit. *See id. at lines 19-25.*

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Claim 4:

The claimed subject matter, as set forth in claim 4, is also a voltage control apparatus 1 for a vehicle. *See* Figure 4. To aid in the following discussion, Figure 4 has been reproduced below.

FIG.4



An additional, non-limiting embodiment of the present invention, is shown above in Figure 4. As with the previously discussed embodiments, the apparatus 1 also contains an input terminal L for inputting a voltage of a battery 5 through an ignition switch 3 and a light emitting element 4, which is connected in series with the switch 3. Further, the rotor coil 201 of the vehicle generator 2 is started in excitation when a voltage at the input terminal L exceeds a predetermined value. However, this embodiment also contains a circuit for detecting the voltage at the input terminal L and starting the apparatus 1, where the circuit is arranged to be shut down after the vehicle generator starts its electric power generation operation.

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In this configuration, when the switch 3 is closed the transistor 144 is supplied, at its emitter terminal, with a voltage passing through the element 4 and the current limiting resistor 115. Because a transistor 133 is applied at its base terminal with the battery voltage through the resistor 148 the transistor 133 is in a conductive state, thus making the transistor 144 also conductive. Because the transistor 144 is also conductive, the transistor 122 is supplied with a base current through a resistor 146, so that the transistor 110 is also turned on. *See Specification, page 14, lines 15-25.* Because the transistor 110 is turned on, the transistor 101 is supplied with a base current through the resistor 104, and is turned on, resulting in the rotor coil 201 being supplied with a field current, making the generator 2 operational.

When the generator 2 starts operation, like the previous embodiments the transistors 132 and 133 are turned off. This also results in the transistor 144 being turned off and, as such, the current to the transistor 122 is shut off, resulting in the element 4 being turned off. Because the transistor 122 is turned off, the transistor 110 is also turned off, whereby the circuit for supplying the base current for the transistor 101 is also shut off. Therefore, after the generator 2 starts the transistor 131 is turned on, thus turning on the transistor 110, whereby the circuit for supplying the base current for the transistor 101 is kept on. Therefore, the circuit for detecting the voltage of the input terminal L and starting the voltage control apparatus is arranged to be shut down, or made inoperable, after said vehicle generator 2 starts electric power generation operation.

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VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1 and 2 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,665,354 to Sada et al.

Claim 4 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Sada in view of U.S. Patent No. 4,642,548 to Mashino.

Claims 6 and 7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Sada in view of Beyn.

Claim 8 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Sada in view of Mashino, and in further view of Beyn.

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VII. ARGUMENTS

Appellant's arguments for patentability are set forth in detail below. Each of the rejected claims will be discussed individually below, unless otherwise indicated.

35 U.S.C. § 102(b) Rejection - Claims 1 and 2:

Claims 1 and 2 continue to stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,665,354 to Sada et al.

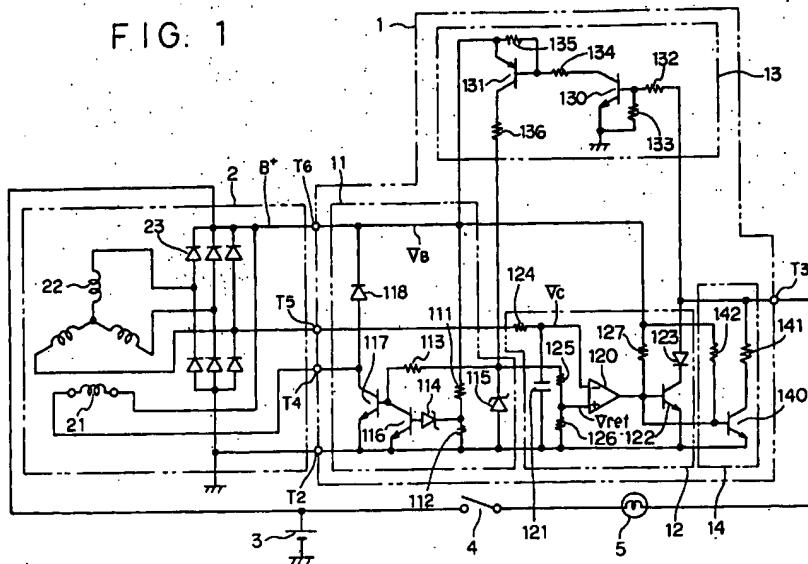
Claim 1:

In rejecting claim 1, the Examiner has alleged that Sada discloses each and every feature of the claimed invention.

Sada discloses a battery voltage regulator system for a vehicle charging system with a voltage control circuit. Specifically, Sada teaches a system containing a battery 3 connected in series with a key switch 4 and a charge lamp 5. "The output of the alternator 2 is also connected to [a terminal] of the battery 3 directly connected to [an] external T₃." Sada, col. 2, lines 52-54. The Examiner asserts that the resistor 141, shown in Figure 1, "limits current flowing through [the] light emitting element" and cites col. 6, lines 10-15 in support of this proposition. The Examiner also notes that the resistor 141 is positioned between the terminal T₃ (i.e. the lamp 5) and a transistor 140. *See* Figure 1, reproduced below.

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FIG. 1



Because of this disclosure, the Examiner asserts that each and every element of the claimed invention is disclosed in Sada. Namely, the Examiner asserts that:

Sada et al. discloses specifically having a resistor 141, which is between a transistor 140 and the input terminal T3. Claim 1 does not provide a more specific use for the transistor within the voltage control apparatus. Sada et al uses the transistor 140, which is used to be turn on/off, thus affecting the switch (column 4, lines 46-49). Moreover, resistor 141 is used as a voltage divider (column 4, lines 31-33), which consumes current and it is also disclosed explicitly that resistor 141 absorbs currents (column 6, lines 21-23). Final Office Action dated April 27, 2004, page 6.

Appellant disagrees with the Examiner analysis and characterization of Sada, and submits that Sada fails to disclose each and every feature of the claimed invention. Specifically, in Sada, there are two transistors (i.e. transistors 122 and 140) which are serially connected to the input terminal T₃. *See e.g.* Figure 1. Of these transistors, it is the transistor 122 which is used to turn on/off the light of the light emitting element (i.e. lamp 5). *See* Sada, col. 2, line 56 (indicating

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that the circuit 12 is the charge lamp drive circuit), *see also* col. 3, lines 30 to 40 (which is an expression of the structure of the charge lamp drive circuit, structured so that the transistor 122 is used to turn on/off the light 5). Comparatively, the transistor 140 is used to compensate for leakage current that flows in the input terminal T₃. *See* Sada, col. 2, line 60 (indicating that the circuit 14 is the malfunction circuit), and col. 3, line 67-col. 4, line 8 (which is an expression of the leakage current compensating circuit, where the transistor 140 is used for the leakage current compensating circuit), *see also* Figure 1. Thus, contrary to the Examiner's assertion, the transistor 140 is not the transistor used to light the lamp 5; the transistor 122 performs this function.

In view of the foregoing, it is apparent that "the resistor being disposed between the transistor 140 and input terminal T₃" (referenced by the Examiner), is not disposed between the transistor for lighting the lamp 5 (which is transistor 122) and the input terminal. In fact, the resistor cited by the Examiner in rejecting the present claims is used in the leakage current compensating circuit. *See* discussion *supra*. Stated differently, the resistor for limiting the flow of current to the lamp 5 is not disposed between the transistor 122 and the input terminal T₃, but between a current leakage transistor 140 and the input terminal T₃.

For at least this reason, Appellant submits that Sada does not disclose each and every feature of the claimed invention. Namely, there is no disclosure of "a resistor for limiting a current flowing through [a] light emitting element, disposed between a transistor within said voltage control apparatus for lighting [the] light emitting element, and said input terminal." *See*

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claim 1. The transistor 140 is not used for lighting the lamp 5. It is the transistor 122, which fails to satisfy the express limitations of the claim.

Moreover, as if recognizing the flaw in the Examiner's own argument and in an effort to bolster the Examiner's position, the Examiner asserts that "Claim 1 does not provide a more specific use for the transistor within the voltage control apparatus." Final Office Action, dated April 27, 2004, page 6. Appellant finds this statement curious. Namely, Appellant submits that the Examiner's statement is incorrect, as claim 1 clearly sets forth a "more specific use for the transistor." Specifically, claim 1 indicates that the transistor is "for lighting [the] light emitting element." *See* claim 1. Appellant submits that this language makes it clear that the subject transistor is the transistor used for lighting the light emitting element, i.e. turning the light emitting element on. Thus, Appellant submits that one of ordinary skill in the art would understand that in Sada, it is the transistor 122 which is responsible for this function, and not the transistor 140. *See supra* above discussion.

In view of the foregoing, Appellant submits that Sada fails to disclose each and every feature of the claimed invention. As such, the Examiner has failed to establish that Sada anticipates the claimed invention, as required under the provisions of 35 U.S.C. § 102(b). Therefore, the rejection of this claim under 35 U.S.C. § 102(b) is improper and should be reversed.

Claim 2:

With regard to claim 2, Appellant notes that in rejecting this claim, the Examiner has provided no specific discussion regarding this claim, and has pointed to no specific aspect of

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Sada which discloses this claim feature. Therefore, Appellant is unsure as to which aspects of Sada, if any, the Examiner is relying to disclose each and every feature of claim 2. However, Appellant disagrees that the lamp 5 is lighted by a current which is inputted into the terminal T₃ for starting an operation of the voltage control apparatus, as required by claim 2. Namely, in Sada, the lamp 5 is lighted by a current which is different than that which is inputted for starting an operation of the voltage control apparatus. Thus, Sada fails to disclose each and every feature of claim 2.

In view of the foregoing, Appellant submits that Sada fails to disclose each and every feature of the claimed invention. As such, the Examiner has failed to establish that Sada anticipates the claimed invention, as required under the provisions of 35 U.S.C. § 102(b). Therefore, the rejection of this claim under 35 U.S.C. § 102(b) is improper and should be reversed.

35 U.S.C. § 103(a) Rejection - Claim 4:

Claim 4 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Sada in view of U.S. Patent No. 4,642,548 to Mashino.

Claim 4:

With regard to claim 4, the Examiner admits that Sada does not teach or suggest having a voltage detection circuit for detecting the voltage at the input terminal T₃, as required by claim 4. In an effort to cure this deficient teaching, the Examiner relies on Mashino. Mashino discloses a control apparatus for controlling the shut-off or interruption of an excitation current supplied to a field winding. The system includes both a power transistor and a voltage detection circuit, where

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the detection circuit controls the on-off of the power transistor depending on the voltage generated by a charging generator. *See* Mashino, Abstract and Figure 1. In view of this disclosure, Appellant submits that Mashino has little or no relevance to claim 4, and one of ordinary skill in the art would not have been motivated to combine the teachings of Mashino with Sada.

Specifically, the voltage detection circuit in Mashino only monitors the terminal L, which is connected to the diodes 6. There is no voltage detection circuit monitoring the voltage at the terminal IG, which allegedly corresponds to the “input terminal,” of claim 4. Thus, even if one were to combine Mashino with Sada, the resultant combination would have no voltage detection circuit, corresponding to that set forth in claim 4. Specifically, even if it were assumed that it would have been obvious to combine the references (which is not Appellant’s position), the resultant combination would fail to disclose, teach or suggest a “circuit for detecting the voltage of [the] input terminal and starting [a] voltage control apparatus, [the] circuit being arranged to be shutdown after [the] vehicle generator starts electric power generation operation.” *See* claim 4. Neither of the references teaches a circuit to monitor a voltage of an input terminal for inputting a voltage of a battery through an ignition switch and a light emitting element connected in series with the ignition switch. *See* claim 4. For at least these reasons, the Examiner’s rejection of claim 4 should be reversed.

However, additionally and independently, Appellant submits that it would not have been obvious to a skilled artisan to combine the references, as suggested by the Examiner, and that the Examiner has not set forth a sufficient basis for the necessary motivation. Specifically, in an

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effort to establish the requisite motivation, the Examiner asserts that “[i]n this case, both references, Sada et al and Mashino et al deal with controlling alternator, specifically for vehicles.” Final Office Action dated April 27, 2004, page 7. However, Appellant submits that this is insufficient to establish the required motivation.

Appellant notes that a critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field. *See In re Kotzab*, 55 USPQ2d 1313, 1316 (Fed. Cir. 2000) (*citing In re Dembicza*k, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999)). Close adherence to this methodology is especially important in cases where the very ease with which the invention can be understood may prompt one “to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention taught is used against its teacher.” *Kotzab*, 55 USPQ2d at 1316 (*quoting W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303, 313 (Fed. Cir. 1983)).

Appellant recognizes that most, if not all, inventions arise from a combination of old elements (although Appellant does not admit that this is the present case, see the discussion above). *In re Kotzab*, 55 USPQ2d at 1316 (*citing In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457 (Fed. Cir. 1998)). Thus, every element of a claimed invention may often be found in the prior art. *Id.* However, identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. *Id.* Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be

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some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant. *In re Kotzab*, 55 USPQ2d at 1316 (*citing In re Dance*, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998); and *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984)).

“Although the suggestion to combine references may flow from the nature of the problem, ‘defining the problem in terms of its solution reveals improper hindsight in the selection of the prior art relevant to obviousness.’” *Exolochem, Inc. v. Southern California Edison Co.*, 2000 U.S. App. LEXIS 22681, *28 (Fed. Cir. 2000) (*citing Monarch Knitting Mach. Corp. v. Sulzer Morat Gmbh*, 139 F.3d 877, 880, 45 USPQ2d 1977, 1981 (Fed. Cir. 1998)). “Therefore, when determining the patentability of a claimed invention which combines two known elements, the question is whether there is something in the prior art as a whole to suggest the desirability, and thus obviousness, of making the combination.” *Id.* at *29-30 (*citing In re Beattie*, 974 F.2d 1309, 1311-12, 24 USPQ2d 1040, 1042 (Fed. Cir. 1992)).

Further, there must be a showing of a suggestion or motivation to modify the teachings of that reference. *In re Kotzab*, 55 USPQ2d at 1316-1317 (*citing B.F. Goodrich Co. v. Aircraft Breaking Sys. Corp.*, 72 F.3d 1577, 1582, 37 USPQ2d 1314, 1318 (Fed. Cir. 1996)); *see also* MPEP § 2142 (*quoting Ex parte Clapp*, 227 USPQ 972, 973 (B. Pat. App. & Inter. 1985)) (“To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.”)

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Moreover, the mere fact that the claimed invention is within the capabilities or familiarities of one of ordinary skill in the art, or “can” be made by the skilled artisan is not sufficient, by itself, to establish *prima facie* obviousness. See MPEP § 2143.01. In the present case, none of these conditions or prerequisites have been satisfied. Namely, the Examiner has asserted only that the references are directed to controlling alternators on vehicles. Appellant submits that this is insufficient to establish the necessary *prima facie* case of obviousness as required under the provisions of 35 U.S.C. § 103(a).

Because of the teachings of the above two references, one of ordinary skill in the art would not have been motivated to combine these references as suggested by the Examiner. Further, even if one would have combined the teachings of these references (which Appellant does not admit), they would not have added the claimed circuit to the device in Sada.

In view of the foregoing, Appellant submits that neither Sada nor Mashino, taken individually or in combination, teach or suggest each and every feature of the claimed invention, either individually or in combination. As such, the Examiner has failed to establish a *prima facie* case of obviousness with respect to claim 4, as required under the provisions of 35 U.S.C. § 103(a). Therefore, the rejection of this claim under 35 U.S.C. § 103(a) is improper and should be reversed.

35 U.S.C. § 103(a) Rejection - Claims 6, 7 and 8:

Claims 6 and 7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Sada in view of Beyn, and claim 8 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Sada in view of Mashino and in further view of Beyn.

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However, Appellant submits that each of these dependent claims stand or fall with their respective independent claims (i.e. 1, 2 and 4). Thus, no separate argument regarding these claims are set forth herein.

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Unless a check is submitted herewith for the fee required under 37 C.F.R. §41.37 and 1.17(c), please charge said fee to Deposit Account No. 19-4880.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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23373
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CLAIMS APPENDIX

CLAIMS 1-8 ON APPEAL (Only Claims 1-2, 4 and 6-8 are being appealed)

1. A voltage control apparatus for a vehicle generator comprising:
 - an input terminal for inputting a voltage of a battery through an ignition switch and a light emitting element connected in series with said ignition switch,
 - a rotor coil of said vehicle generator started in excitation when a voltage at said input terminal exceeds a predetermined value, and
 - a resistor for limiting a current flowing through said light emitting element, disposed between a transistor within said voltage control apparatus for lighting said light emitting element, and said input terminal,

wherein no other transistor is disposed between said transistor and said light emitting element.
2. A voltage control apparatus for a vehicle generator comprising:
 - an input terminal for inputting a voltage of a battery through an ignition switch and a light emitting element connected in series with said ignition switch, and
 - a rotor coil of said vehicle generator started in excitation when a voltage at said input terminal exceeds a predetermined value, wherein

 said light emitting element is lighted by a current which is inputted into said input terminal for starting an operation of said voltage control apparatus.
3. The voltage control apparatus for a vehicle generator according to claim 2, wherein

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said light emitting element is coupled through said ignition switch to a base terminal of an NPN transistor for starting an operation of said voltage control apparatus so that said light emitting element is turned on by a current flowing into said base terminal.

4. A voltage control apparatus for a vehicle generator comprising:
 - an input terminal for inputting a voltage of a battery through an ignition switch and a light emitting element connected in series with said ignition switch,
 - a rotor coil of said vehicle generator started in excitation when a voltage at said input terminal exceeds a predetermined value, and
 - a circuit for detecting the voltage of said input terminal and starting said voltage control apparatus, said circuit being arranged to be shutdown after said vehicle generator starts electric power generation operation.

5. The voltage control apparatus for a vehicle generator according to claim 4, wherein
 - after said circuit for detecting the voltage of said input terminal and starting said voltage control apparatus is shutdown after said vehicle generator starts electric power generation operation, an operation of a starting circuit for said voltage control apparatus is maintained by an output of one phase of said vehicle generator.

6. The voltage control apparatus for a vehicle generator according to claim 1, wherein

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a light emitting diode is used as said light emitting element.

7. The voltage control apparatus for a vehicle generator according to claim 2,

wherein

a light emitting diode is used as said light emitting element.

8. The voltage control apparatus for a vehicle generator according to claim 4,

wherein

a light emitting diode is used as said light emitting element.

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EVIDENCE APPENDIX

NONE

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RELATED PROCEEDINGS APPENDIX

NONE